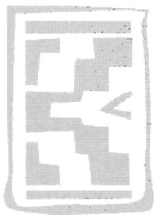

Molineus cati n. sp. (Nematoda, Trichostrongylina, Molineoidea), a parasite of feral cats, *Felis catus* Linnaeus, 1758 in South Africa

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ABSTRACT

DURETTE-DESSET, MARIE-CLAUDE, BOOMKER, J. & MALAN, F.S. 2000. *Molineus cati* sp. n. (Nematoda, Trichostrongylina, Molineoidea), a parasite of feral cats, *Felis catus* Linnaeus, 1758 in South Africa. *Onderstepoort Journal of Veterinary Research*, 67:173–177

A new species of the genus *Molineus* Cameron, 1923 was recovered from feral cats, *Felis catus* Linnaeus, 1758, in Mpumalanga Province, South Africa. Because of a caudal bursa with rays of the 2-1-2 type, but with the extremities of rays 4 nearer those of rays 3 than those of rays 5, the new species is closely related to seven Neotropical *Molineus* spp., four parasitic in Primates, two parasitic in Mustelidae and one a parasite of Procyonidae. Amongst these species, only *Molineus barbaris* Cameron, 1936, a parasite of *Tayra barbara* (Mustelidae) from Trinidad and *Molineus vexillarius* (Dunn, 1961), a parasite of *Tamarinus nigricollis* (Primates) from Peru have rays 4 longer than two-thirds the length of rays 3, like the new species. However, the new species is differentiated from the other two in that rays 9 arise at the level of the bifurcation of the dorsal ray and not after the division as is the case with *M. barbaris* and *M. vexillarius*.

Keywords: *Molineus cati*, Nematoda, Trichostrongylina, Molineoidea, *Felis catus*, Felidae, South Africa

INTRODUCTION

The genus *Molineus* was created by Cameron (1923) and redefined by Durette-Desset & Chabaud (1981b). It consists of 28 species, parasitic in Carnivora throughout the world (except Australia) and in Neotropical Primates. Three species were described in the Afrotropical region, two from Viverridae (Cameron 1927; Le Roux 1933) and one from Canidae (Troncy 1970). The new species represents the first record of a *Molineus* sp. of Felidae in this region. However, since it is a parasite of a domestic cat, *Felis catus* Linnaeus, 1758, it is not possible to determine whether it is a parasite of the Afrotropical region or was introduced from some other biogeographical region together with its host.

MATERIALS AND METHODS

During a survey of *Taenia* spp. in the vicinity of Middelburg, Mpumalanga Province (25°44'–25°47'S; 29°25'–29°30'E), a total of 22 feral domestic cats were caught and processed for worm recovery. Nematodes of the genus *Molineus* were encountered in the small intestine of four of these cats. The helminths were fixed and stored in 70 % ethanol, studied in temporary wet mounts in water and, when necessary, cleared in lactophenol. Apical views and cross-sections were mounted and studied in lactophenol. Measurements are given in micrometers unless otherwise stated.

The nomenclature of taxa higher than the family-group is that of Durette-Desset & Chabaud (1993).

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The synlophe was studied according to the method of Durette-Desset (1985), and the nomenclature used for the components of the caudal bursa is that of Durette-Desset & Chabaud (1981a).

DESCRIPTION

Type material

Holotype male, allotype female, number 187 MQa; three male and two female paratypes plus three posterior parts of female paratypes, number 187 MQb. All the specimens have been deposited in the Museum National d'Histoire Naturelle, Paris.

Type host

Felis catus Linnaeus, 1758 (Carnivora, Felidae).

Site

Small intestine.

Type locality

Middelburg, Mpumalanga Province (25°44'–25°47'S; 29°25'–29°30'E).

Etymology

The species is named after its host.

Description

Small nematodes, body not coiled. The nerve ring, excretory pore and deirids are situated at the same level, at mid-oesophagus (Fig.1I). A circular excretory groove, not surrounded by cuticular expansions, is present, as is an excretory sinus, 38 long (Fig. 1A and B).

Head

A cephalic vesicle is present. In apical view, the buccal opening is rounded and surrounded by two small amphids, six externo-lateral papillae and four cephalic papillae (Fig. 1D).

Synlophe

(Studied in one male and one female). In both sexes, the cuticle bears a varying number of uninterrupted ridges which appear posterior to the excretory groove (Fig. 1C) and disappear just anterior to the caudal bursa in male and at the caudal extremity in female (Fig. 1H). In the male, the number increases from 14 at the level of the oesophago-intestinal junction to 16 at mid-body (Fig. 1E), then to 28 in front of caudal bursa (Fig. 1F). In the female, the number increases from 21 at the oesophago-intestinal junction to 28 in the anterior third of body, then decreases to 16 at mid-body and increases again to 30 in the posterior third of body. Only the ventral ridges are interrupted in front of the vulva (Fig. 1G). Ridges are regularly spaced except those opposite the lateral fields, which are closer together and slightly smaller than the other. The smaller ridges continue for the entire length of the body of the male (Fig. 1E and F) but are present only at mid-body in female. Ridges are orientated perpendicularly to the body surface (Fig. 1E–H).

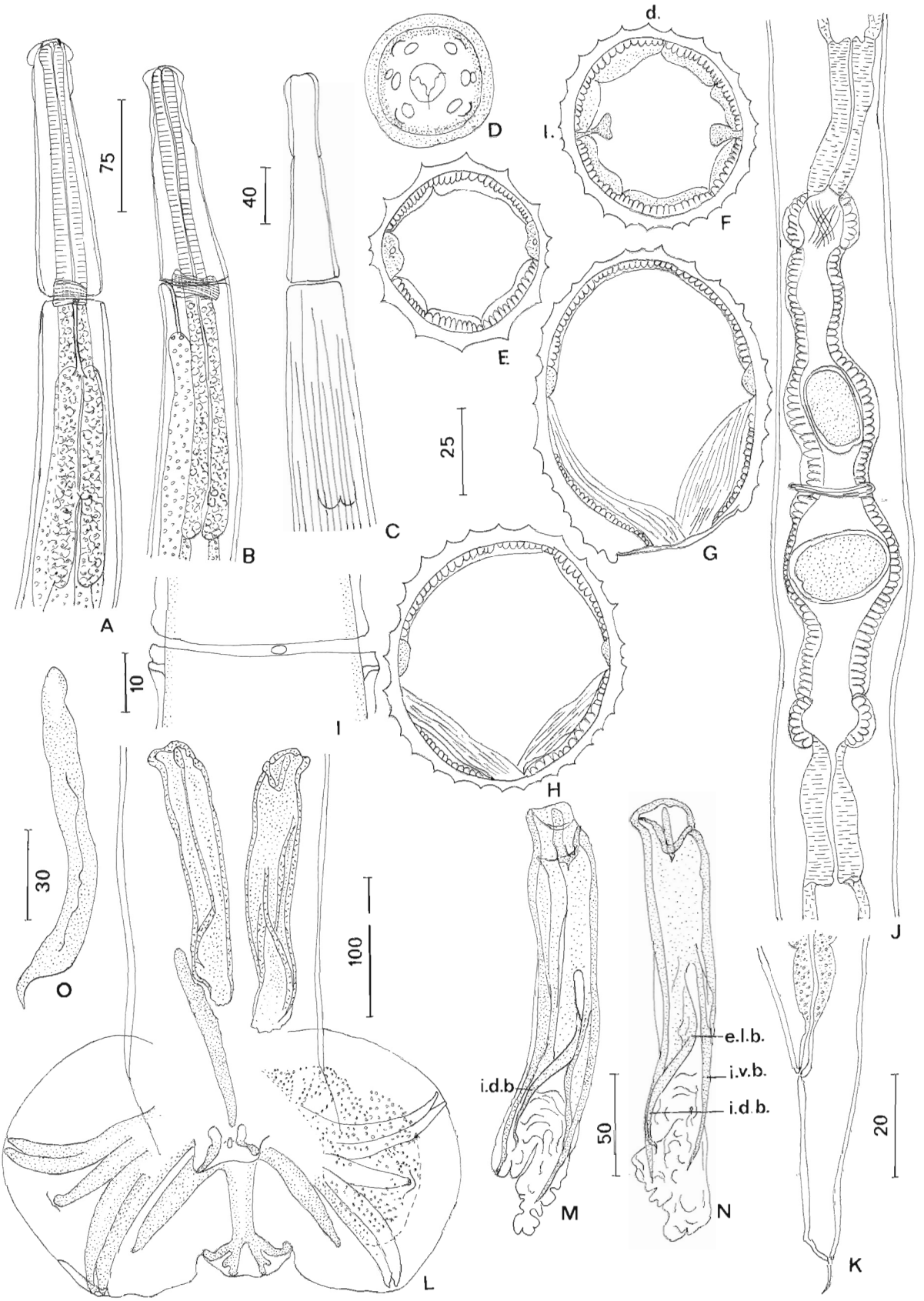
FIG. 1 *Molineus cati* n. sp.

A:	Female, anterior extremity, ventral view
B:	Holotype male, anterior extremity, left lateral view
C:	Male, anterior extremity, ventral view showing the appearance of the cuticular ridges
D:	Male, head, apical view
E–H:	Transversal sections of the body
E:	Male at mid-body
F:	Male, 400 µm above caudal bursa
G:	Female at vulva level
H:	Female, between vulva level and tail
I:	Female, detail of the excretory pore, the excretory groove and the deirids, ventral view
J:	Female, ovejector, ventral view
K:	Female tail, left lateral view
L:	Male, caudal bursa, ventral view. The spiny projections are illustrated only on the left lateral lobe
M, N:	Left spicule, dorsal and internal views
O:	Male gubernaculum, left lateral view

Note: The transversal sections are all orientated as indicated in Fig. 1F

Abbreviations: d, dorsal side; l, left side; e.l.b., externo-lateral branch; i.d.b., interno-dorsal branch; i.v.b., interno-ventral branch

Scale bars: A, B, J: 75 µm; C: 40 µm; D, O: 30 µm; E-H: 20 µm; I: 10 µm; K: 20 µm; L: 100 µm; M, N: 50 µm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Holotype male

The nematode is 5,1 mm long and 65 wide at mid-body. The cephalic vesicle is 55 long by 20 wide. The nerve ring, excretory pore and deirids are situated at 150, 150 and 155 from the apex, respectively, and the oesophagus is 335 long (Fig. 1B).

The caudal bursa is symmetrical and the bursal ray pattern is of type 2-1-2. Spiny projections occur on the lateral lobes (Fig. 1L). Rays 4 are short with their extremities nearer those of rays 3 than those of rays 5. Rays 8 are thick and arise from the basis of the dorsal ray, and are slightly shorter than the latter. The dorsal ray is divided into two branches at its distal extremity, each one in turn giving rise to three small branches; firstly, the external branches (rays 9), then the phasmids and rays 10 (internal branches).

The spicules are alate, 95 long, with the handle slightly shorter than blade. The blade is divided into two primary branches, the externo-lateral branch and the interno-ventral branch. The interno-dorsal branch arises from the externo-lateral branch and is smaller. All three the branches have sharp tips and are enveloped by a membrane (Fig. 1M and N). In ventral view the gubernaculum is rectangular in shape while in lateral view it is slightly curved (Fig. 1O).

The two paratype males are 4,6 and 4,8 mm long and 65, 60 wide at mid-body. The cephalic vesicle measures 50, 55 long by 20, 20 wide. The nerve ring, excretory pore and deirids are situated at the same level, 160, 160 and 165 from the apex, respectively. The oesophagus is 360, 355 long. The spicules are 105, 120 long and the gubernaculum is 75, 72 long in ventral view.

Allotype female

This female is 5,7 mm long and 65 wide at mid-body. A cephalic vesicle is present and measures 60 long by 20 wide. The nerve ring, excretory pore and deirids are situated at 165, 170, 175 from the apex, respectively. The oesophagus is 390 long. The uterus is didelphic and the vulva situated 1 100 from the caudal extremity, in the posterior sixth of the body. The *vagina vera* is 25 long and the vestibule 320 long. The anterior sphincter and infundibulum are 35 x 40 and 65 long, respectively, and the posterior sphincter and infundibulum 30 x 40 and 55 long, respectively (Fig. 1J). The anterior uterine branch is 960 long and contains 8 eggs while the posterior uterine branch is 500 long and contains 6 eggs. The eggs, in the morula stage, are 60 long by 45 wide. The tail is 60 long and the caudal spine is broken (seen only in 2 paratypes, 11 long) (Fig. 1K).

The two paratype females are 6,4 and 5,9 mm long and 80, 60 wide at mid-body. The cephalic vesicle is 65, 55 long by 23, 20 wide and the nerve ring is situated 180, 140 from the apex, the excretory pore 180, 140 and the deirids 185, 145, respectively. The oesophagus is 370, 360 long. Vulva is situated 1,1 and 1,2 mm from the caudal extremity. The vestibule is 305, 320 long. The anterior sphincter and infundibulum measure 45 x 48, 35 x 45 and 100, 70 long, respectively and the posterior sphincter and infundibulum 35 x 45, 30 X 40 and 90, 80 long, respectively. The anterior uterine branch is 800, 840 long and contains 12, 9 eggs while the posterior uterine branch 550, 580 long with 10, 4 eggs. Eggs in the morula stage measure 50, 58 long by 35, 40 wide. The tail is 60, 60 long and the caudal spine 11, 11 long.

DISCUSSION

The specimens from *Felis catus* belong to the genus *Molineus* Cameron, 1923 (Molineoidea), because of a synlophe with ridges orientated perpendicularly to the body surface and the pattern of the bursal rays. Rays 2 and 3 (ventral) are close together and run parallel as do rays 5 and 6 (lateral) and a short 4th ray is present. The spicules are short and thick, and the female is didelphic and her tail bears a spine.

Amongst the 28 species described, only seven species (four in Primates, two in Mustelidae and one in Procyonidae), all of Neotropical origin, share two common characters with the parasites of the cat, namely that the pattern of the caudal bursa is of type 2-1-2 (i.e. rays 4 arising from the common trunk at the same level as rays 2 and 3 on one side and rays 5 and 6 on the other) tending towards type 3-2 (i.e. extremities of rays 4 nearer those of rays 3 than those of rays 5) (Durette-Desset & Chabaud, 1981a). The second characteristic lies in the shape of the spicules, which have a blade that is divided into three branches of equal length.

Of these seven Neotropical species, five can be separated from the specimens of the cat by rays 4, which are shorter than two-thirds of the length of rays 3. Three species, *Molineus elegans* (Travassos, 1921), from *Saimiri sciurea* in Brazil, *Molineus midas* Durette-Desset & Corvione, 1998, from *Sanguinus midas* in French Guyana and *Molineus torulosus* (Molin, 1861) from *Cebus capucinus* in Brazil, occur in Primates, *Molineus nasuae* Lent et Freitas, 1938 occurs in *Nasua narica* (Procyonidae) in Brazil and *Molineus major* Cameron, 1936 in *Tayra barbara* (Mustelidae) from Trinidad. The parasites of the Primates and of *N. narica* are differentiated by the shape of the gubernaculum, of which the proximal part is adorned with a hook while the parasite of *T. barbara* is characterized by rays 8 being much shorter than the dorsal ray. In the remaining two species, *Molineus barbaris* Cameron, 1936 from *T. barbara* from Trinidad and *Molineus vexillarius* (Dunn, 1961) from *Tamarinus nigricollis* (Primates) in Peru, like in the

specimens of *Felis*, rays 4 are longer than two-thirds the length of rays 3. However, *M. barbaris* and *M. vexillarius* can be differentiated from *M. cati* in that rays 9 arise on the dorsal ray after the division of the latter whereas rays 9 arises at the level of the division in the parasites of the cat.

The parasites of *Felis cati* belong to a new species for which we propose the name *Molineus cati* n. sp.

It is interesting to note *M. cati* is closely related to *Molineus* spp. of the Neotropical region rather than the Afrotropical species but, since *Molineus cati* was found in a domestic host, it is not possible to draw conclusions on the origin of the parasite.

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